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Population-wide sodium reduction: The bumpy road from evidence to policy

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Abstract

Elevated blood pressure is a highly prevalent condition that is etiologically related to coronary heart disease and stroke, two of the leading causes of morbidity and mortality throughout the world. Excess salt[a] (sodium chloride) intake is a major determinant of elevated blood pressure. In this paper we discuss the scientific rationale for population-wide salt reduction, the types and strength of available evidence, policy-making on dietary salt in the United States and other countries, and the role and impact of key stakeholders. We highlight a number of lessons learned, many of which are germane to policy development in other domains.

INTRODUCTION

Many of the most common diseases in the US and worldwide are chronic conditions that reflect prolonged exposure to suboptimal lifestyle conditions that are often nutrition-related.[1] Evidence-based policies on preventative measures are critical to reduce the public health burden of these diseases, such as hypertension, arthrosclerosis, and their sequelae.

[a]In this paper, the terms sodium and salt (sodium chloride) are used interchangeably, largely because over 90% of sodium intake comes from salt, which is sodium chloride. To convert gm of salt to mg of sodium, multiple gm of salt by 393. To convert mg of sodium to gm of salt, divide mg of sodium by 393.

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Policy-making related to lifestyle factors, particularly dietary factors, is complex and often depends on epidemiologic evidence, including ecologic and longitudinal observational studies. Clinical trials, particularly those with well-established surrogate outcomes, have a valuable role as well, while trials with outcomes such as stroke, myocardial infarction, and death are uncommon for diet and lifestyle factors in the general population.

The purpose of this paper is to provide insights related to policy-making on dietary salt[a] intake. Specially, the paper will cover the scientific rationale for population-wide salt reduction, the types and strength of available evidence, the history of policy-making on dietary salt in the United States and other countries, and the role and impact of key stakeholders. This case study should be of considerable relevance to individuals, particularly students and trainees, who are interested in the application of epidemiologic methods to prevention policy.

CONTEXT

Scientific Overview

Blood pressure (BP)-related diseases are leading causes of morbidity and mortality in the United States and throughout the world.[2] There is a direct relationship between BP and heart disease, stroke, and end-stage renal disease (ESRD).[3] The relationships between BP and its sequelae have been characterized as strong, consistent, continuous, independent and etiologically relevant.[4] Importantly, the risk of BP-related diseases increases progressively throughout the range of BP, including both hypertensive and non-hypertensive ranges.[3] Worldwide, an estimated 47% of coronary heart disease events and 54% of strokes can be attributed to elevated BP.[2] A cardinal feature of the elevated BP epidemic is the age-related rise in BP, in both children and adults.[5,5]

Types and Strength of Existing Evidence Related to Health Effects of Sodium

Excess sodium intake has a prominent and likely predominant role in the pathogenesis of elevated BP.[6, 7] Other lifestyle factors that increase BP include excess weight, insufficient potassium intake, high alcohol consumption, suboptimal dietary pattern, and physical inactivity. Supportive evidence on the adverse effects of excess sodium intake on BP comes from animal studies, migration studies, ecologic studies, longitudinal observational studies, clinical trials, and meta-analyses of trials. The best available evidence strongly supports a direct relationship between sodium intake and elevated BP - on average, as salt (sodium chloride) intake increases, so does BP.[8]

Nonetheless, the evidence base does have limitations. First, the measurement of sodium intake remains methodologically challenging.[9] Both random and systematic errors in the measurement of dietary sodium intake are commonplace. The gold standard is urinary excretion of sodium from 24 hour urine collections, but even these estimates can be inaccurate because of incomplete urine collections. Furthermore, because of large day-to-

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day variation in individual sodium consumption, repeat measurements on multiple days are needed to enhance precision. Such methodological issues have led to inconsistent and occasionally paradoxical findings.[10, 11, 11]

A second limitation relates to the perceived strength of evidence. In the hierarchy of designs, the randomized clinical trial is considered the strongest for medical research. For sodium, over 50 trials of sodium reduction with blood pressure as an outcome have been conducted. A trial of sodium reduction with major clinical outcomes in the general population is considered unnecessary for the purposes of policy making given the strength of existing evidence that links excess sodium intake with elevated blood pressure. Such a trial might also not be feasible given the nature of the exposure, specifically, a chronic, lifelong exposure that is largely not under individual control. Further, a trial with sufficient statistical power to detect reductions in outcome measures such as heart attacks and strokes in general population would require an excessively large sample size and budget, and is unlikely to be supported. In contrast, the benefits of a new drug or surgical procedure are often evident within a much shorter time frame, and can be formally assessed in a randomized clinical trial conducted in a targeted population.

The body of data linking excess sodium intake with blood pressure has been sufficiently compelling for policy-makers to recommend population-wide sodium reduction. The 2010 U.S. Dietary Guidelines recommend no more than 1,500 mg of sodium/day in blacks, hypertensive individuals, and middle- and older-aged persons and 2,300 mg of sodium/day in all other adults.[12] Average intake levels greatly exceed these recommendations and are estimated to be more than 3,400 mg of sodium/day in most age groups of men, women and children.[13] This assessment comes from food intake surveys which demonstrate persistently high levels of sodium consumption over the past 40 years.[14] Over three-fourths of the sodium consumed by Americans comes from processed packaged and restaurant foods, and is already in the products at the time of purchase.[15] A much smaller proportion, just over 10%, comes from salt added at the table or during cooking. The remaining dietary sodium is found naturally in foods. These observations highlight the need for changes to the food supply in order to accomplish population-wide reductions in sodium intake.

Evolution of Salt Policy in the US

Elevated lifetime sodium intake and its association with the development of hypertension received high-level attention as early as 1969 at the White House Conference on Food Nutrition and Health.[16] This event marks the start of salt reduction efforts in the United States. The conference proceedings recommended that food processors reduce the amount of salt they add to their foods as a means to reduce population levels of intake. The report also identified a number of key elements needed to improve general nutrition, many of which would become relevant to US sodium reduction policy approaches that followed. For example, it called upon the federal Food and Drug Administration (FDA) to review the list of foods and ingredients that the FDA considered “generally recognized as safe”(GRAS), a categorical listing under which salt also falls and which allows it to be added to processed foods without limitation. The report also recognized the increasing contribution of processed food to total daily intake, noting the “concomitant loss of consumer control over the

nutritional quality of foods purchased".[18] It recommended that the FDA produce guidelines for food manufacturers that would include a set of recommended minimum and maximum levels of nutrients in their foods.

Early US policies approached the task of population-wide sodium reduction by emphasizing consumer education with the intent of stimulating individual behavior change. A second approach, pursued more intensely in recent years, is an effort to change behavior by changing the context of consumer decision-making. In this case, the intent is to create a food environment that supports reduced sodium intake by making lower sodium foods the norm. This approach should be more effective with respect to sodium reduction given that the majority of salt consumed is already in processed food at the time of purchase.

Notable consumer education efforts started in 1972, when the National Heart Lung and Blood Institute (NHLBI) of the National Institutes of Health (NIH) launched the National High Blood Pressure Education Program (NHBPEP).[17] Central to this effort were broad-reaching education programs that targeted the general public, patients, and health professionals, and included information on the relationship of salt intake with hypertension. Supporting materials, tools, and scientific reviews and recommendations followed. In 1980, the US Dietary Guidelines for Americans made its first formal recommendation that most Americans should avoid consuming too much sodium.[18] In 1981, the FDA launched a public education initiative and encouraged manufactures to provide sodium content information on packaged food labels. By 1993, sodium was formally included in the list of nutrients that would be mandatory on packaged food labels. When target values were set, a daily value (DV) of 2,400 mg was established. That same year, the FDA introduced sodium requirements into the criteria used to determine if a food claim would be allowed on a food label. In recent years, the required disclosure of sodium on packaged foods has been extended to chain restaurant foods, first through local and state regulatory initiatives and subsequently through congressional mandates requiring information on sodium content be provided upon request.

Food labeling and claims regulation not only provide information for consumer decision-making but also create incentives for industry to formulate products differently. Companies may intentionally meet specific food claims criteria in order to make the product more attractive to the consumer upon review of the nutrition facts panel. Other policies that affect intake through changing the types of foods available include institutional and government food procurement policies, and federal food commodity and food program standards that set nutritional criteria for sodium. For example, in 1995, the United States Department of Agriculture (USDA) set sodium standards for food commodity categories that affected school meals. Nutrition procurement policy examples exist at the city, state and federal government level, as well as in hospitals, workplaces and other private institutions. Vending machine policies that include restrictions on the sodium content of offered products have also been introduced in schools and other government and workplace settings.

Voluntary efforts by industry to lower the sodium content of the processed food supply, as called for by the 1969 White House Conference, have also been pursued. In 1980, the US Department of Health and Human Services (HHS) set as a national objective that sodium in

processed foods should be reduced by 20% by 1990.[19] The American Public Health Association and American Medical Association appealed to industry to reduce the sodium content of their foods by 50% within 20 years in 2002 and 2006, respectively.[22,23] These efforts did not include clearly articulated monitoring and accountability plans. Thus we can only speculate as to their impact.

Launched in 2008, the National Salt Reduction Initiative (NSRI) is pursuing voluntary commitments from industry to meet specific targets for over 80 packaged and restaurant food categories. The NSRI is a partnership of over 80 local and state health authorities and organizations. Sodium reduction targets have been set for 2012 and 2014. To date, 28 food companies have committed to select NSRI targets, including some of the nations' largest food manufacturers and restaurant chains such as Kraft, Campbells, Subway, and Starbucks. The NSRI emphasizes monitoring and evaluation and has developed packaged food and restaurant databases to assess changes in the food supply. In addition, New York City conducted a baseline 24-hour urinary sodium study in 2010 to measure the impact of the NSRI on population sodium intake. A follow up study will be conducted in 2014.

Regulating the amount of sodium allowed in processed foods is another potential policy approach to change the food environment. In 1982, the FDA rejected consumer petitions requesting reclassification of salt from GRAS status to being a "food additive", a move that would have resulted in regulating the amount of sodium added to food. However, in 2010, modification of salt's GRAS status and regulation of sodium limits by food category were the primary recommendations of an Institute of Medicine Committee tasked with identifying the best approach to reduce sodium intake in the US.[14] The FDA responded in 2011 with the release of a public request for information related to sodium reduction approaches.

Global Initiatives

Worldwide, there has been increased attention to salt reduction. In 2003, the World Health Organization (WHO) recommended that adults consume no more than 5g of salt per day.[20] Regionally, the European Union developed a salt reduction framework in 2008 that aims for a 16% reduction of salt levels in processed foods over four years.[21] In 2009, the Pan American Health Organization (PAHO) set up an expert committee with the aim of reaching either the WHO or national salt intake targets by 2020.[22] In 2010, the WHO held two multi-stakeholder information exchange forums and key technical meetings aimed at providing guidance for national sodium reduction efforts. The first focused on creating an enabling environment for salt reduction, the second on evaluating and monitoring. In September 2011, the United Nations held a high level meeting on global non-communicable diseases (NCDs). The meeting's Political Declaration that was adopted by all member states prominently noted the link between unhealthy diet, including high salt intake, and NCDs. The United Nations called upon private industry to reduce sodium in foods, and upon nations to implement salt reduction strategies and recommendations that would reduce the marketing of unhealthy foods to children, including those high in sodium. Based upon cost effectiveness and feasibility to implement, WHO recognizes salt reduction as one of a limited number of recommended "best buy" interventions to reduce NCDs.

Webster et al identified 32 countries with salt reduction strategies in place, of which 28 were led by governments.[21] All but two either had or planned to promote food reformulation; Portugal and Argentina were the only countries that planned to use a regulatory rather than voluntary approach at that time. A few countries have subsequently demonstrated the effectiveness of their strategies: the United Kingdom (UK), Finland, Japan, France, and Ireland.

United Kingdom—The UK Food Standards Agency (FSA) salt campaign is noteworthy because of its demonstrated success in reducing salt intake, voluntary collaboration with the food industry, and use of surveillance data. Launched in 2003, the campaign aims to reduce salt intake from 9.5 to 6 grams per day through packaged food reformulation, consumer awareness campaigns, and improved front-of-pack nutrition labeling.[22] In 2006, the FSA published voluntary 2010 and 2012 salt reduction targets for 85 categories of food based on both average salt levels and stakeholder input. The UK has published company commitments and progress on their website and tracks changes through the purchase of packaged food nutrition and proprietary sales data among other routes. Intake estimated by population-level urinary sodium analysis studies conducted in 2001 and 2008 documented a reduction from 3,800 milligrams in 2001 to 3,400 milligrams in 2008.[20]

The UK experience also highlights the importance of non-government organizations (NGOs) in policy-making. The Consensus Action on Salt and Health (CASH), an NGO made up of scientific experts, was formed in 1996 to raise awareness of the dangers of excess salt intake after the government failed to recommend a 6 g per day salt intake limit in 1994.[23] Their lobbying has been instrumental in convincing both the UK government and the food industry to pursue salt reduction.[23]

Finland—Experience from Finland illustrates the impact of policy on salt intake and the uses of epidemiologic surveillance data in setting priorities and tracking progress. The North Karelia Project, begun in 1972, is a community-based intervention program designed to reduce cardiovascular disease risk factors. The 80% decline in coronary mortality from 1972 to 2007 is credited mainly to risk factor reduction from policies and programs implemented by this project.[24] Over this time period, the greatest changes in risk behaviors were related to diet.[25]

A major aspect of the dietary strategy was salt intake reduction, achieved through national legislation on labeling, surveillance of sodium intake and excretion, education of the public on nutrition skills, and collaboration with the food industry to develop reduced salt products.[26] Due to these programs and policies, between 1979 and 2002, average urinary sodium excretion decreased from over 5,000 mg to < 3,900 mg/day among men, and from over 4,100 to <3,000 mg/day among women.[27]

Other Countries—The success of the UK model has inspired others to follow its example, including but not limited to the NSRI described earlier. The Salt Reduction Program of Ireland has published salt reduction targets for certain food categories as well as food industry commitments.[28] While Canada's strategy is still in development, Health Canada

recently released draft sodium reduction targets for 33 types of packaged foods in 2009 and is working on targets for another set of foods.[29]

STAKEHOLDERS

A variety of stakeholder groups, crossing many disciplines, have fueled the policy debates about sodium. This section briefly summarizes the roles of several stakeholders, particularly those influencing US policy.

Professional health-related organizations

Numerous professional organizations advocate population-wide sodium reduction including, but not limited to the American Medical Association, the American Public Health Association, and the American Heart Association.[34,35] More recently, the American Society of Hypertension has issued guidelines advocating a reduction in sodium intake, as well as public health efforts to achieve this goal.[30] Each of these organizations has a broad policy agenda of which sodium reduction is just one component. Hence, the effort expended by these organizations on sodium reduction is quite variable.

Scientists

A broad spectrum of scientists, including epidemiologists, clinical researchers, and bench scientists, as well as practicing physicians and public health officials, view excess sodium intake as etiologically related to vascular disease and thus a major public health problem.[31] Still, there are some scientists, occasionally quite prominent, who have concluded otherwise.[32]

As with any area of research that has the potential to impact private industry, conflict of interest is a concern.[33] Just as the pharmaceutical industry often funds drug studies, the food industry also funds nutrition studies. Further, some scientists are, or have been, consultants to institutions which have financial interests related to levels of population sodium intake, such as the Salt Institute, a trade association of salt manufacturers.[33] The challenge for policy makers, government officials, and the general public is to understand the merit of arguments made by those with conflicts of interest and the relevance and quality of evidence they present.[34]

Government

The effects of sodium intake on health have been a major concern of numerous government bodies. At the federal level, the NHLBI has been a principal source of funding for basic, epidemiologic and clinical research on the health effects of sodium intake. As discussed previously, the NHBPEP of NHLBI was involved in developing guidelines for the prevention and treatment of hypertension and in assembling a coalition of professional and government organizations with the goal of improving BP control. As part of its efforts, NHBPEP promoted sodium reduction. With recent organizational changes at NHLBI, hypertension and sodium efforts continue but have become part of educational initiatives with broader goals, namely, control of all of the major cardiovascular risk factors.

Other agencies of the federal government have had an important role in promoting sodium reduction. The USDA and HHS issue dietary guidelines every 5 years, and reduced sodium intake has been a consistent recommendation. The Centers for Disease Control and Prevention (CDC) has developed a substantial interest in cardiovascular disease prevention and is supporting several sodium reduction initiatives. Recently, the CDC-sponsored Institute of Medicine reports on improving BP control and on developing national strategies to lower sodium intake.[14] Through the National Center for Health Statistics-supported National Health and Nutrition Examination Surveys, the federal government conducts surveillance of sodium intake through 24 hour dietary recall and is launching efforts to measure 24 hour urinary sodium excretion. Healthy People 2020, the US government's 10 year objectives for improving the health of all Americans, includes 2 objectives related to reducing sodium intake.

State and local governments are also developing initiatives to lower sodium intake in the population. As discussed previously, the NSRI is a partnership of over 80 state and local health authorities and national health organizations. The New York City Department of Health coordinates these efforts.

Commercial interests

Commercial interests include a wide-spectrum of industries that manufacture, prepare and sell food, as well as trade associations, such as the National Restaurant Association, the Grocery Manufacturers Association, the Chamber of Commerce, and the Salt Institute. Some companies and organizations have opposed salt reduction policies, including voluntary initiatives. In contrast, a number of companies have taken progressive stances and have agreed to reduce the sodium content of the products they sell or produce, independently or as part of announced efforts such as the NSRI or the First Lady's "Let's Move" campaign.

Other Interest Groups—One of the more vocal opponents of salt reduction in the United States has been the Center for Consumer Freedom (CCF), an organization that describes itself as a "non-profit organization devoted to promoting personal responsibility and protecting consumer choices."[35] CCF writes and places ads in newspapers, radio, and television, calling efforts to reduce sodium in processed foods a "nanny state" policy. While the names of CCF donors are not publically available on their website, the organization notes that that it receives donations from the restaurant and beverage industries and that executives from these industries sit on its board.[36]

A strong proponent of sodium reduction is World Action on Salt and Health (WASH), a non-government organization established in 2005.[37] WASH was founded with the aim of achieving a gradual reduction in salt intake worldwide by encouraging multi-national food companies and national governments to take action on salt reduction. Members are often scientists and public health experts. It is a single issue advocacy group that focuses exclusively on salt. A multi-issue NGO, the Center for Science in the Public Interest (CSPI), has had a long-standing interest in reduced sodium intake. CSPI has developed reports, such as "Salt, the Forgotten Killer" and has been a strong proponent of a regulatory approach to reducing sodium intake.

LESSONS LEARNED

The previous sections provide the scientific rationale for sodium reduction, a review of the types and strength of existing evidence, a summary of policy-making in the United States and other countries, and the context for decision-making, with a focus on major stakeholders. The next section provides insights aimed at individuals, particularly students and trainees, who are interested in policy-making.

1. *Epidemiologists have a crucial role in evaluating and synthesizing evidence*. The array of evidence to be considered in policy-making is typically heterogeneous in type, volume, and quality. For sodium, there are also methodological issues, particularly related to measurement of dietary intake, that are inadequately recognized by many scientists, In addition, the promulgation of findings from studies with flawed methods, uninformative results, or biased results, creates confusion and perpetuates controversy. Policy makers need the assistance of epidemiologists to make sense of the vast body of evidence.

2. *Evidence-based medicine, while applicable to many medical therapies, creates unrealistic expectations for evaluating prevention strategies*. The most rigorous design for hypothesis testing is the randomized trial. For sodium, numerous trials have tested the effects of sodium reduction on BP, a well-accepted surrogate outcome for risk of vascular disease. Yet, no large RCT designed specifically to test the effect of sodium reduction on heart attack, stroke or mortality in the general population has been conducted. As discussed earlier, such a trial may not be feasible, particularly in the United States, given the nature of the exposure, and the sample size needed. Some may question if such a study would be ethical given the existing body of evidence. Still, some individuals have questioned the evidence base for public policy related to dietary salt intake (and more broadly nutrition policy) and have called for large-scale trials[38].

3. *Multidisciplinary research is required*. Prevention and control of elevated BP are complex problems that need to be addressed at multiple levels and among many different disciplines, not just epidemiology and the medical sciences. These areas include agriculture, food sciences, marketing, transportation, and education. Multidisciplinary research provides valuable opportunities to collaborate on interventions aimed at improving the health and wellbeing of both individuals and communities. For example, tobacco research efforts have been successful in facilitating cooperation among advertising, policy, business, economics, medical science, and behavioral science groups in order to bridge scientific discovery and research translation by engaging a wide range of stakeholders. A multidisciplinary approach has also shown some evidence of effectiveness in obesity prevention, and should be pursued by researchers interested in addressing sodium reduction.

4. *Modeling, particularly cost-effectiveness analyses, often has a valuable role in policy-making*. Modeling is often used to quantify disease burden and to project the impact of various intervention strategies on health outcomes and costs. The very success of public health prevention efforts that keeps immediate threats of

morbidity and mortality out of public concern is often what keeps these endeavors from remaining top priorities on policy agenda. Cost-effectiveness modeling can conceptualize seemingly intangible evidence into terms of lives and money saved. For example, one study estimated that reduction of dietary salt intake by 3g per day would save 194,000 to 392,000 quality-adjusted life-years and $10 to $24 billion in health care costs annually, while reducing the annual number of deaths by 44,000 to 92,000.[39] This approach transforms preventative efforts into tangible monetary savings, which may increase the likelihood that policy makers and the public view these public health interventions as high priorities.

5. *Understand all sides of the argument*. Scientists, even those who contribute to policy-making, often focus their efforts on the set of scientific issues that provide the rationale for public policy. For sodium, the scientific community that supports population sodium reduction has focused on the adverse effects of sodium intake on BP and vascular disease. Opponents have a much broader set of arguments, only some of which address the relationship of sodium to BP. Scientific arguments include (i) tangential scientific issues (e.g. acute effects of extreme sodium restriction on biomarkers of uncertain clinical relevance,[40] heterogeneity of BP response to reduced sodium intake), (ii) hypothetical issues (e.g. volume depletion in setting of severe, acute illness or extreme temperatures and activity), and (iii) competing health interests (e.g. the potential adverse effects of reduced consumption of iodinized salt and food safety issues related to reduced use of sodium preservatives)[6]. Major scientific bodies have considered and have found these arguments insufficient, clinically irrelevant, or readily addressed through sound policy making.[8]

   In addition to scientific arguments, there is a philosophical argument that policies leading to a reduction in the sodium content of foods impede an individual's freedom to make decisions related to sodium intake. This line of reasoning parallels the "free choice" arguments made about cigarette smoking. A counter argument is that the current food environment, replete in excess sodium, makes it difficult for individuals to exercise their freedom to reduce their sodium intake. A food environment with lower sodium increases individual freedom by allowing individuals to either consume a low sodium diet or add sodium back to their foods, to their liking.

6. *There is a need for continued research*. The effects of excess sodium intake on BP are indisputable. Still, monitoring and evaluation of implemented policies is critical to assess their direct and indirect impacts, such as levels and trends in sodium intake and the effects of specific policies on sodium intake, BP levels and BP-related outcomes. Expectations should be realistic. First, sound sodium reduction policy will not reduce population sodium intake abruptly, hence reductions in population BP levels and BP-related morbidity will also be gradual. Second, research on sodium can be challenging to implement and expensive. The federal government funds most research on the health effects of sodium, and there is virtually no commercial support for this research. The result is a less research and therefore publicity on the health effects of sodium.

7. *Special training is extremely useful for epidemiologists who are interested in policy-making*. Epidemiologists receive substantial training in scientific and statistical methods, and most have the opportunity to apply this type of knowledge as part of their regular activities. In sharp contrast, they rarely have training, let alone experience, in policy-making.[41] As previously mentioned, epidemiologists have a crucial role in the assessment and synthesis of evidence. Epidemiologists also may play an important role in public health policy by communicating scientific information to media representatives and elected or appointed policy makers.[42,43] This has been shown in policy efforts as diverse as motor vehicle safety, immunization requirements, and tobacco regulation.[44] To be effective at such communication, however, epidemiologists would greatly benefit by receiving training from experts who work in policy and media environments. Communicating with advocates, policy makers, the media, and other players involved policy issues is challenging and inherently different from presenting information to scientific audiences.[45]

8. *Policy-making is not for the faint of heart*. Generally, academic scientists focus their efforts on teaching, conducting research, and reporting their research to the scientific community. In contrast, serving on policy-making bodies, while important from a societal perspective, is largely an honorary activity in which senior scientists devote considerable effort into evaluating and synthesizing scientific findings and then making and communicating recommendations. The downstream benefits might include professional advancement. However, there are costs, particularly the time involved in understanding the plethora of scientific, practical, and political issues that influence sound policy-making.

SUMMARY

It has long been known that public health policy has a profound impact on our daily lives and on population-level indicators of health status, including the risk of cardiovascular disease. Many policy interventions are underway to reduce salt intake at the population level. This case study has summarized progress in this field and offers lessons for practitioners, policy makers, and researchers as they seek to translate epidemiology into policy.

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